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AUTHOR	Wilmot, William; King, Stephen
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ABSTRACT

The authors examine published research in speech communication and evaluate its potential for theory development. Two major suggestions are advanced that will facilitate the quest for viable theory of speech communication. First, research should begin to focus on relevant communication behaviors rather than merely using them as convenient contexts to test selected theories. Second, researchers should be required to report the degree of association between the selected independent variables and the dependent communication behaviors. Unless these suggestions are adopted, it is the authors' contention that the quest for viable theories will be hindered. The incorporation of the suggestions will assist the field to (1) compare theories in terms of their ability to predict communication behaviors, and (2) construct viable theories of communication behavior. (Author)

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METHODOLOGICAL BARRIERS PRECLUDING THE DEVELOPMENT OF COMPREHENSIVE THEORY

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William Wilmot
Dept. of Speech Comm.
University of Montana
Missoula, Montana 59801

Stephen King
Dept. of Speech Comm.
San Diego State College
San Diego, California 92115

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Stephen King
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Speech communication is in the throes of an evolution. Like other branches of knowledge such as psychology, sociology, and political science, speech communication is following the usual progression of development. The discipline "begins with armchair speculation, proceeds to observation by extreme empiricists who say 'let the data speak for themselves' and finally gets to the point of testing of hypotheses and theories."[1]

Those of us trained in the scientific method realize that the desired goal in the behavioral sciences "is theory that is truly comprehensive..."[2] Most researchers seem to agree that research which is most instrumental to the development of an intellectual discipline is conducted within the context of theory development."[3] Theory construction, then, is our goal.

It is the position of this paper that present practices of conducting and reporting research preclude the attainment of viable theories of communication. First, present research does not systematically explore communication behaviors. Second, present journal articles and research monographs do not provide readers with information concerning the <u>importance</u> of independent variables in producing effects on dependent variables.

I. THE FAILURE TO FOCUS ON COMMUNICATION BEHAVIORS

According to the New Orleans Conference on Research and Instructional Development, the speech communication discipline should emphasize "the behavioral antecedents and consequents of messages and their variations, as well...as the ways that messages interact with communication participants to produce behavioral outcomes."[4] This and other recommendations of the New Orleans Conference indicate that knowledge of communication behavior and research that leads to such knowledge should be of paramount concern. In other words, we must seek a multiply-connected set of empirically extensible constructs.[5] One would assume that with this aim quantitative research in communication would be directed toward the illumination of communication behavior.

A review of current literature, however, reveals that most researchers do not systematically pursue this goal. Rather than examining a particular communicative behavior from various perspectives, many researchers seem to be concerned with demonstrating the predictive validity of a "pet" theory. Frequently, the behaviors examined seem to be merely convenient contexts within which to test a theory. The research is apparently directed toward attaining knowledge of the antecedent elements of the

antecedent-consequent relationships. Knowledge of the effects of specified independent variables is, therefore, growing, but our understanding of the process of communication is advancing slowly. Although many studies could be cited, a variety of representative works will demonstrate the present focus of research.

Dissonance theory has been tested in many behavioral contexts and the research can be represented as in Figure 1.[6]

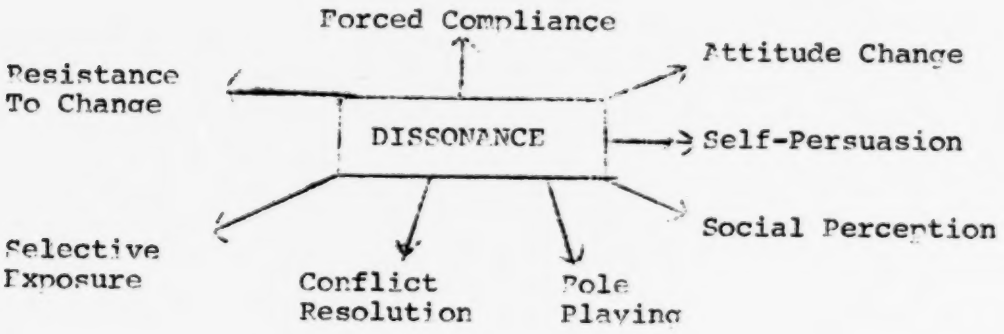

Figure 1

Here, the theory, cognitive dissonance, is the focal point of the research program and any gain in understanding of the various behaviors examined is apparently coincidental. The purpose of the experimentation is validation of the theory.

The review article by Waculis and Songer, which collected all the experimental work conducted within the dissonance context, epitomizes the overriding concern for

theories.[7] Three hundred and nineteen separate studies were listed whose only commonality was the fact that "cognitive dissonance theory...was relevant to the publication."[8] Knowledge of the predictive validity of the theory was paramount while knowledge of the various behaviors was only of secondary interest.

Experimentation on the variable of ego-involvement further illustrates the point. Investigators have tried to demonstrate the effects of ego-involvement on such diverse dependent measures as attitude change, ability of dyads to reach agreement, and communicator credibility.

Even when experimental investigations are launched outside the parameters of a given theory, the focus remains on independent variables. Two studies are representative of this genre of research: Barker, Kibler, and Kelley, and Kibler and Barker.[9] While these studies <u>can</u> be interpreted as investigating speech effectiveness ratings and comprehension, the apparent motivation behind the initiation of both studies, when considered together, is the manipulation of the variable of mispronunciation.

All the above studies manifest a corollary to Kaplan's Law of Instrument--manipulate your favorite independent variable in every behavioral context and sooner or later you will find something it affects.[10]

Textbooks and reference books also focus on theories and independent variables rather than communication behavior.

In Persuasive Communication by Bettinghaus, for instance, the results of numberous experiments are organized according to the independent variable-regardless of the dependent variable of the experiment.[11] The apparent interest is knowledge of the effects of independent variables. Insko's Theories of Attitude Change, while it serves as a valuable reference work, also stresses theories and independent variables.[12] It is organized into chapters solely on the basis of the various theories discussed. Again, the ostensible interest is knowledge of a theory's predictive validity and not specific communication behaviors. Another widely used text, Attitude Change and Social Influence by Cohen, manifests an overriding concern for the various effects of numberous independent variables.[13] Cohen discussed the results of experiments under such headings as: The Effects of Stating a Conclusion, The Effects of Order of Presentation, and Studies of The Effects of Approval and Disapproval.[14] The way in which the book is organized suggests that knowledge of the effects of independent variables is more important than knowledge of the various determinants of specific communication behaviors.

Finally, Thompson's ambitious compilation of the quantitative research in communication through 1964 should be considered.[15] Thompson offered generalizations based on research and then cited studies to support each general-

ization. The following generalizations are indicative of the book's focus:

(1) Moderately poor vocal quality, poor pitch patterns, nonfluency, and even stuttering do not interfere significantly with comprehension.[16]

(2) Delivery affects comprehension and persuasiveness significantly.[17]

(3) Sentence length, vocabulary, and certain stylistic devices probably increase comprehension.[18]

(4) Ethos does not appear to affect learning.[19]

(5) Climax and anticlimax methods of organization do not differ significantly in persuasiveness...[20]

(6) Disorganization appears to affect comprehension in written communication, but effects upon comprehension and effectiveness in oral communication are doubtful.[21]

These examples illustrate two important characteristics of current research strategy. First, by making an independent variable the subject of each generalization, Thompson indicates that knowledge of independent variables is paramount. Second, although four of the generalizations directly concern comprehension, no attempt is made to consider the relative importance of the various determinants--because research which generates such comparisons is scant.

Focusing on theories and independent variables has had a dramatic impact on theory building and the advancement of knowledge of communication behavior. Examine

Figure 2, where the communication behaviors are numbered (behavior number 1 is the same across all the diagrams).

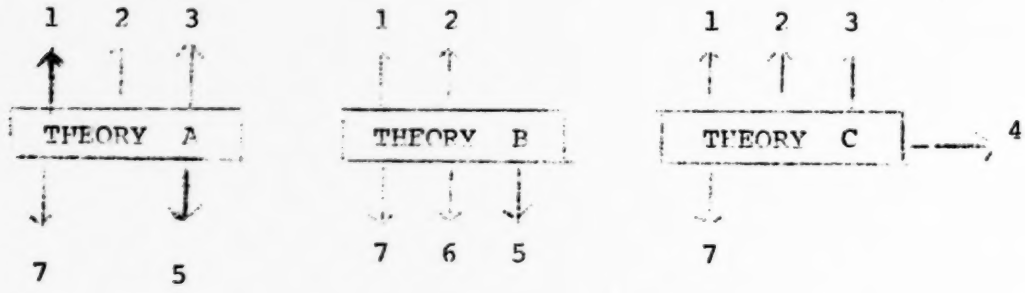

Figure 2

(#'s = behaviors)

Which theory best explains behavior number 2? If that behavior is attitude change, for instance, the selection of the best theoretic explanation is often based on the researcher's current interests rather than on the theory's ability to predict behavior number 2. Few experiments compare the theories in terms of their ability to predict and explain behavior number 2. The lack of experimentation comparing theoretic explanations prompts the coexistence of many theories, often contradictory, purporting to explain the same behavior. Furthermore, because theories are rarely directly compared, the relative contribution of various determinants of a given behavior are unknown.

The detrimental effect of this pervasive research strategy can be at least partially alleviated by focusing

on behavior. That is, we need to determine the relative predictive accuracy of each theory in explaining the same behavior. Only then will knowledge of the process of communication be advanced. Obviously, this goal can only be achieved through a series of multivariate research projects. Cohen recognized the necessity for comparative research after he reviewed the single variable research using message variables and he said, "As is true for the entire area of persuasive communication and attitude change...future study should be based...on the conducting of crucial experiments which pit one theoretical approach against another."[22] An example of the recommended strategy may help clarify this approach.

If attitude change as a result of persuasive communication is the behavior of interest, it is known that many classes of variables have been shown to affect this behavior. To choose just one such class of variables for purpose of illustration, the question might be asked, "What is the relative importance of the various message variables that have been previously found to affect persuasive impact?" Such a question arises out of the knowledge that variables x, y, z, and w have been shown to have a significant effect on attitude change when manipulated independently. The research program necessitated by this question can be schematized as in Figure 3.

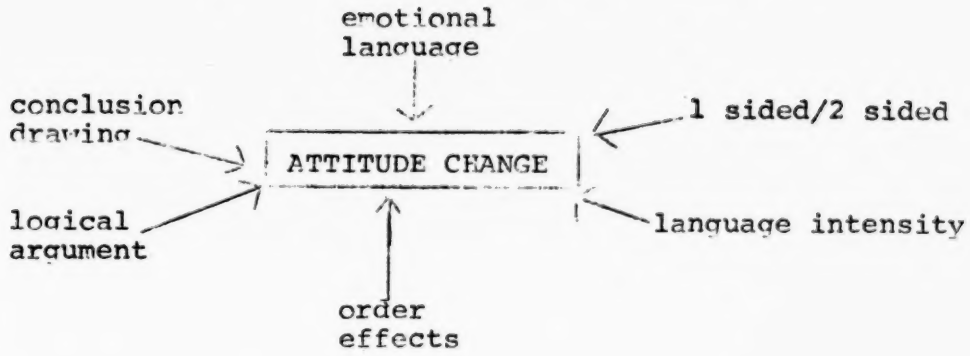

Figure 3

In this program of research, two or more variables would be simultaneously manipulated and their relative impact on the manifest attitude change determined. A series of experiments successively including and excluding all of the identified variables would result, ultimately, in a vertical classification of the relative importance of all of the variables as determinants of the behavior examined. The same type of experimentally-generated hierarchy could be derived for theories. That is, a series of experiments could be conducted to determine the relative predictive accuracy of all theories presuming to explain a given behavior.

Though the suggested change in research strategy is simple, the impact of its adoption would be great. Most

research projects currently establish that variable X affects behavior A or that theory 2 predicts behavior B. Research conducted with the organization suggested in this paper will be able to assert that variable X affects behavior A either more, less, or the same as variables U, V, W, and Y or that Z predicts with greater, lesser, or equal accuracy when compared with theories C, D, E, and F. The current approach to research yields knowledge of theories and variables; the recommended strategy would advance knowledge of behavior in terms of theories and variables.

The proposed research strategy has a number of important implications. First, the increased concern with knowledge of communication behavior may necessitate a greater specification of dependent variables. For instance, the questions may be asked: "Are two theories of attitude change really attempting to explain the same phenomenon or does one explain such mediating processes as perception, attention, or comprehension?" "Is conformity the same dependent variable whether it results from compliance or internalization?" In short, a concern for understanding communication behavior would necessitate a close examination of the nature of the various behaviors in which communication researchers are interested.

Second, the multivariate techniques required for the program of research suggested here must be mastered

by communication researchers. Evidence of increased methodological sophistication can be found in the journals, but it seems essential that multivariate techniques must be understood not simply because they allow a researcher to manipulate two or more variables but also because only through their utilization can the relative impact of variables on the behavior examined be assessed directly.

Third, comparative research "will lead theories to expand to encompass new conditions" and "speak to the comparative viability of one theory in relation to another."[23] "In due time, the less viable theories will be cast aside and the more tenable ones will survive and become guides for future research, and they will become the objects of conceptual modification."[24]

II. THE FAILURE TO ESTIMATE THE MAGNITUDE OF INDEPENDENT VARIABLE EFFECTS

If the field of Speech Communication is going to attempt to assess the relative impact of independent variables on communication behaviors, then current research reports need to be expanded. Typically, if the independent variable(s) produces statistically significant changes in the dependent variable(s) the experiment is interpreted as adding support to the selected theory. While the test of statistical significance is frequently presumed to represent a sufficient test of an hypothesis, it is not.

As one sociologist notes, "It is never a sufficient condition for concluding that a theory has been corroborated..."[25]

The test of statistical significance only tells us, within a certain percent chance of being wrong, that chance factors are rejected as the explanation. We infer, therefore, that the independent variable or variables produced the scores on the dependent variable. One difficulty with tests of significance is that a very weak statistical relationship will be detected because significance is easy to achieve. Hays notes that "virtually any study can be made to show significant results if one uses enough subjects, regardless of how nonsensical the content may be."[26]

We can add to the usefulness of statistical tests by measuring the relative magnitude of impact that independent variables have on dependent behaviors. If we are attempting to synthesize research, a "coherent synthesis cannot be forged from a collection of relationships of unknown strengths and magnitudes. The necessary conditions for a synthesis include an <u>evaluation</u> of the results available in the field, a coherent interrelating of the <u>magnitude</u> found in those results, and the construction of models based on those magnitudes."[27] The magnitude of an association between two variables is <u>not</u> measured by a test of significance. A significant statistic merely indicates a relationship exists, but, as

Hays notes "...in no sense does this mean that an important degree of association necessarily exists."[28]

If the development of coherent theory depends upon knowledge of the degree of association between an independent variable and dependent variable, and the tests of significance do not provide this information, how can researchers attain it? What needs to be done is to compute the percent of dependent variable variance accounted for by the independent variable. If an independent variable accounts for all the variance in the dependent variable, then, of course, the phenomenon is explained in that case. Consequently, the closer to 100% of the dependent variable variance that is explained the stronger is the relationship between the independent and dependent variables.

As Figure 4 illustrates, the formulas for assessing the impact of the independent variable on variables are already available. In correlational studies using the Pearson r, the percent of the variance explained by the independent variable is simple r^2. In chi-square analyses, the strength of the association can be measured by numerous techniques. The most generally applicable measure seems to be Cramer's statistic. With appropriate adjustments for the number of cells, it can become a standard measure which will vary between 0 and 1.0.[29]

Statistic	Measure of Strength of Independent Variable Effects
r	r^2
x^2	$e' = \frac{x^2}{N(L-1)}$ (a)
t	est. $\omega^2 = \frac{t^2-1}{t^2+N_1 = N_2-1}$
F One-Way ANOVA Fixed Effects	est. $\omega^2 = \frac{SSBetween-(J-1)MS\ Within}{SSTotal + MS\ Within}$ (b
F Two-Way ANOVA Fixed Effects	est. $\omega^2 v/x = \frac{SSCols-(C-1)MS\ Error}{MS\ Error + SS\ Total}$ (c)
	est. $\omega^2 v/z = \frac{SSRows-(R-1)MS\ Error}{MS\ Error + SS\ Total}$
	est. $\omega^2 v/xz = \frac{SSInt.-(R-1)(C-1)MSError}{MS\ Error + SS\ Total}$

(a) L is taken to represent the smallest number of rows or columns, whichever is smaller.
(b) In this case, Omega squared obviously represents the degree of strength of the main effect. (J=# groups)
(c) These three formulas are used, respectively, for computing Omega squared for Columns, Rows, and Interaction effects. (R=# rows; C=# columns)

Figure 4

The t and F distributions are used most frequently by speech communication researchers. After running a t test between sample means, the researcher has only to apply the formula for omega squared to obtain the percent of the variance accounted for by the groupings. Omega squared, like the other measures, represents the relative reduction in uncertainty about the value of the dependent variable given knowledge of the independent variable.

When the F test is employed, the determination of the strength of association must match the particular model of analysis of variance. For the fixed effects model, one way ANOVA, the variation in the dependent variable is due to (1) the variance caused by the independent variable and (2) error variance. Omega squared, therefore, gives the proportion of the total dependent variable variance attributable to the independent variable. This same principle is expanded for the fixed effects, two-way ANOVA. The total variation is due to the two treatments, the interaction, and error. Omega squared reveals the strength of association between the dependent variable and these influences.

For the one and two-way random effects ANOVA, the percent variance calculations are just as simple but are based on a different theoretic substructure. Measures

of association for the one-way is by the intra-class correlation coefficient and for the two-way is by omega squared.[30] Obviously, for mixed effects models of ANOVA, the measures are equally easy to apply. For more complex ANOVA designs, Vaughn and Corballis have suggested appropriate formulas for calculating the percent influence of the independent variables on the dependent variables.[31]

Expected Magnitude of Independent Variable Effects

The immediate reaction of researchers who report the percent variance values may be one of pessimism about the results of their research. A quick look at r^2 values shows that a very small amount of explained variance is sufficient to produce statistical significance. For example, with an N of 100 a zero-order correlation of .1946 is sufficient to be statistically significant at the .05 level.[32] The percent variance value of this significant r is .0378. Only 4% of the dependent variable variance is accounted for by the independent variable that was significantly related to the dependent variable.

A researcher using the F distribution, therefore, should not be too surprised to find that his significant relationship only explains a very small amount of the dependent variable variance. Placing qualitative judgments on these values will be somewhat difficult but Cohen suggests that those judgments can be made. He

He writes that an F test that explains 14% of the variance should be considered to have explained a large amount. Though the relative merits of the percent amounts probably cannot be determined a priori, if speech communication researchers begin computing percent variance values, then the actual values found in research can be the basis for comparison.

The efforts associated with computing and comparing the percent of variance explained will yield beneficial results. First, if percent variance values become the accepted practice for publications, researchers will be forced to grapple with the relative importance of their selected independent variable or variables. As a result, authors will be less likely to confuse relative importance of a variable with its statistical significance.

Second, the standard reporting of percent variance values will serve an auxiliary function of providing information about the effects of independent variables that did not achieve statistical significance. If a researcher used a small sample size, the independent variables may have had a large impact on the dependent measure and still not achieved statistical significance. Reporting the percent variance accounted for, therefore, may highlight relationships that need to be pursued in future research.

And, finally, the long-range value from percent variance reporting is a more accurate estimation of the relative importance of independent variables, which will allow for direct comparisons between theories. While percent variance values apply only to the sample under study, theories can be evaluated in terms of their ability to explain dependent behavior. In addition, unless percent variance values are computed, our current reporting practices preclude construction of estimates of the predictive ability of theories.

Present Reporting Practices

Initially, the authors had a three-fold goal. First, to demonstrate the necessity to examine communication behaviors; second, to illustrate how research reports could report the magnitude of association between independent and dependent variables; and, third, to compute measures of association for the past five years of research published in Speech Monographs. The fulfillment of these three objectives would provide an extensive overview of the current status of theory in speech communication.

Sadly, it is impossible to assess the magnitude of association extant in published research in speech communication. Most research reports utilize the F test and do not provide the necessary information for

observation of the effects attributable to the independent variable(s). The reports usually only report the value of the F ratio (F=5.20, 3=50 d.f.) without the necessary accompanying information. The formulas in Figure 4 require that complete ANOVA tables be reported so that essential information is present.

Journals of communication research should immediately require (and permit) authors to report complete information on ANOVA tests. Unless the journals alter their practices, then (1) the estimation of independent variable effects is impossible, (2) the comparative testing of theories will not be successful and (3) comprehensive theory development will be blocked.

Our theories are talking past one another. We need to start establishing linkeages between the major variables.[34] Different theories need to be cast against one another in the same experiment, and independent variables derived from the theories need to be compared across experiments. And the focus of our research needs to be on dependent communication behaviors. Until speech communication scholars re-evaluate the current practices in conducting and reporting experiments, comprehensive theory development will elude us.

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